



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,849	07/25/2003	Chien-Chao Huang	N1085-00151	2641
8933	7590	12/21/2004	TSMC2003-002	
DUANE MORRIS, LLP IP DEPARTMENT ONE LIBERTY PLACE PHILADELPHIA, PA 19103-7396			EXAMINER LE, DUNG ANH	
			ART UNIT 2818	PAPER NUMBER

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/627,849

Applicant(s)

HUANG ET AL.

Examiner

DUNG A LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) 14-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/12/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Oath/Declaration

The oath/declaration filed on 7/25/03 is acceptable.

Election/Restriction

Application's election without traverse of Group I (Claims 1- 13) drawn to a semiconductor device is acknowledged for prosecution in the subject application . Applicants have the right to file a divisional, continuation or continuation-in-part application covering the subject matter of the non-elected claims.

Drawings

The drawings are objected to for the following reason:

Figures 1- 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The specification is objected to for the following reason:

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed (see MPEP § 606.01).

A new abstract is required that is clearly indicative the invention to which the claims are directed.

Note that, the claims are directed to semiconductor device instead of to a method of making a semiconductor device.

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 6-11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kammler et al. (6746927 B2) in view of Lur et al. (6013569).

Kammler et al. teach a semiconductor device comprising:

a substrate; a gate region on top of the substrate; a first and second sidewall liners 7p situated on a first and second sides of the gate region 3p respectively, the first and second sidewall liners having a vertical part contacting sidewalls of the gate region and a horizontal part contacting the substrate; and

a first and second recessed spacers 9p situated on top of the first and second sidewall liners respectively, wherein a height of the first and second recessed spacers 9p is lower than a height of the sidewall liner 7p, and wherein the horizontal part of each sidewall liner is the same length of the corresponding recessed spacer on top thereof. (fig. 1f)

Kammler et al. do not teach the horizontal part of each sidewall liner is shorter than the corresponding recessed spacer on top thereof.

Lue et al. disclose that the horizontal part of each sidewall liner 66 is shorter than the corresponding recessed spacer 64 on top thereof. (figs 8-9).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the horizontal part of each sidewall liner is shorter than the corresponding recessed spacer on top thereof in Kammler 's structure, in order to proceed with little stress (col 8, line 64) for other processes which follow the processing step of the presentation.

Regarding claim 4, wherein the gate region further includes a gate dielectric 6p/6n and electrode layers 3p/3n (fig. 1e - 1f)

Regarding claim 6, the recessed spacer is SiN based (Kammler, col 2,line 10).

Regarding claim 7, Lur teaches the recessed spacer further includes Ge, Ar, or O₂ based impurities. (col 8, lines 20-25)

Regarding claim 8, the sidewall liner 7p is oxide based (Kammler).

Regarding claims 9- 11, Lur et al. disclose a contact etching stopper (CES) layer²⁸ formed over the recessed spacer with a predetermined stress level; the CES layer imposes a compressive stress and the CES layer imposes a tensile stress (col 10, lines 10- 17).

Claims 2, 3 , 5 and 12 -13 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kammler et al. (6746927 B2) in view of Lur et al. (6013569) and further in view of the following remark.

Kammler et al. in view of Lur et al. disclose the claimed invention as applied to claim 1, except for the height of the recessed spacer is at least 50 Angstroms lower than the height of the vertical part of the sidewall liner; the horizontal part of each gate sidewall liner is at least 10 Angstroms shorter than the recessed spacers and the height of the gate region does not exceed 1800 Angstroms as cited in current claims..

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the height of the recessed spacer is at least 50 Angstroms lower than the height of the vertical part of the sidewall liner; the horizontal part of each gate sidewall liner is at least 10 Angstroms shorter than the recessed spacers and the

height of the gate region does not exceed 1800 Angstroms, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 12 and 13, Kammler et al. in view of Lur et al. disclose the claimed invention as applied to claims 1 and 9, except for the stress level of contact etching stopper layer is larger than 200M Pa and the thickness of the CES layer is smaller than 600 Angstroms.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the stress level of contact etching stopper layer is larger than 200M Pa and the thickness of the CES layer is smaller than 600 Angstroms, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE
Primary Examiner
Art Unit 2818

